*051998 - Design and Robotics - Robotics and Design*

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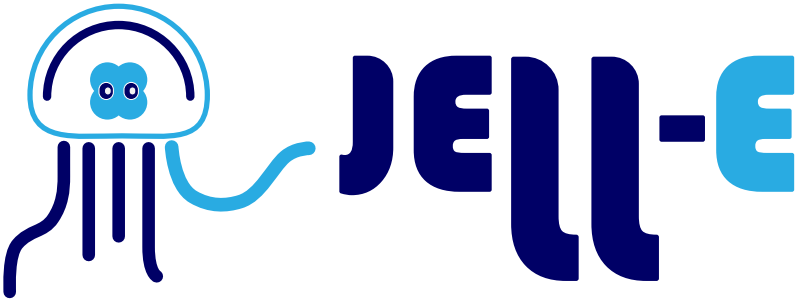


# Jell-E | The revolution of emotions

Maintenance Manual

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## *Jell-E | The revolution of emotions*

*Project developed in collaboration with:*

*AirLab - Politecnico di Milano - Leonardo Campus*
*Lab Prototipi - Politecnico di Milano - Bovisa Campus*
*Lab Moda - Politecnico di Milano - Bovisa Campus*

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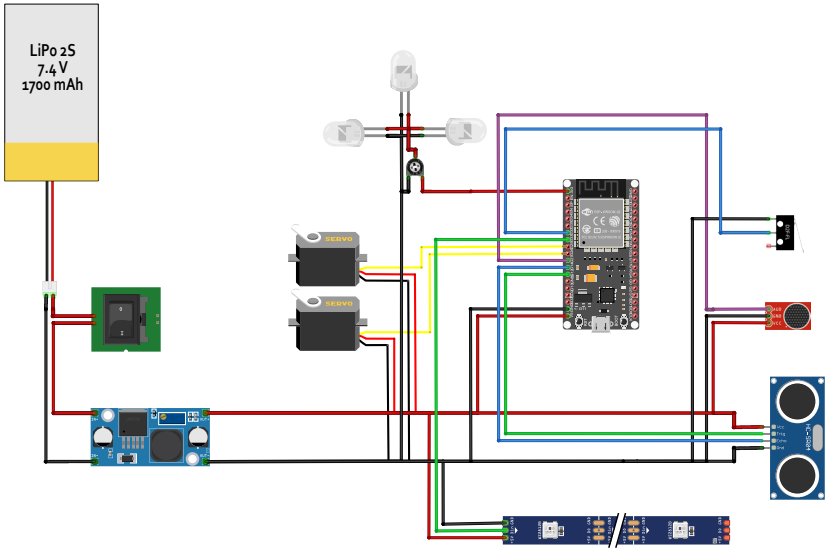
## Circuit | Overview of the internal components

Maintenance Manual

This manual aims at making the maintenance process simple. For an optimal analysis of the internal electrical components, a schematic diagram of the circuit is shown.

The complete circuit is composed by 2 servomotors; 1 LiPo battery (1700 mAh); 1 ESP board; 1 swtich; 1 step-down; 1 microphone, 1 limit switch (finecorsa - ITA); 10 LEDs on a RGB strip lights and 20 LEDs obtained from a white strip lights.



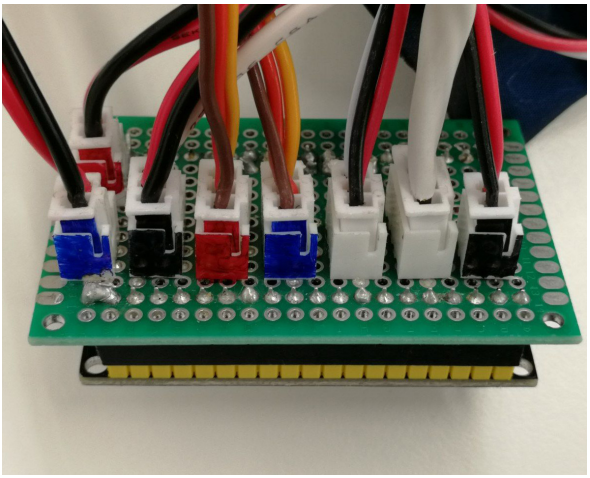

The battery needs to be recharged if it goes under 7.40 V otherwise the electronic circuit could not work properly. In case of battery change, place it correctly in the robot case as shown in the picture.
Connect the battery to its own connector and press the button under the case to turn on the robot. After 3 seconds from the switching the robot is ready to interact, as is possible to see the eyes leds start the “breath” gesture.

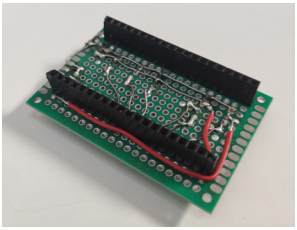
Remove the battery if the robot is going to be not used for a long time.

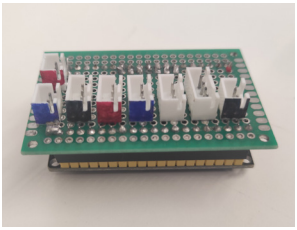
## Board | Pins and connectors

Color code

Connections of sensors and actuators to the board are not interchangeable. To connect them correctly it is necessary to match the right colors (red, black, blue and white) and the same number of pins (two, three, and four) for each connector.

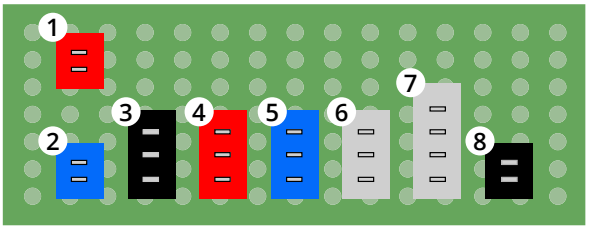






## JST connectors

The existing 4-pins connector is the only one present on the board, and it is attached to the ultra sonic sensor. There are four 3-pins connectors and three 2-pins connector. The following scheme is provided to an optimal user experience.

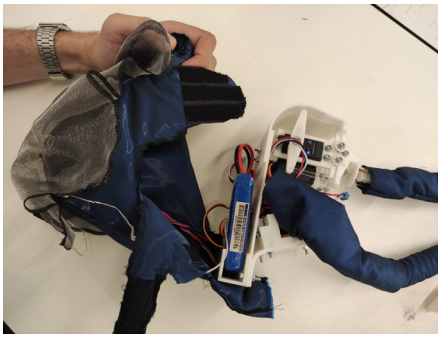



1 - Limit switch
2 - Step down
3 - LED Strip
4 - Servo motor
5 - Servo motor
6 - Microphone
7 - Ultra sonic
8 - Lights

## Maintenance process

### Disassembly

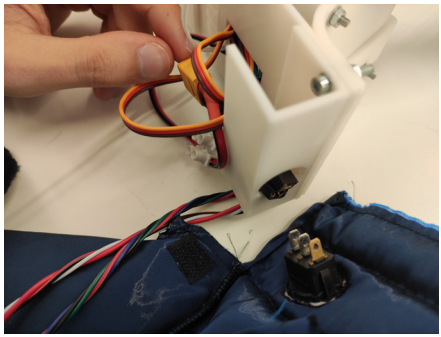
*For an optimal experience of maintenance it is fundamental to understand and visualize how the board is assembled in order to know what every single pin is attached to.*



1 - Remove the fabric cover from the robot, to facilitate the accessibility to the internal parts.

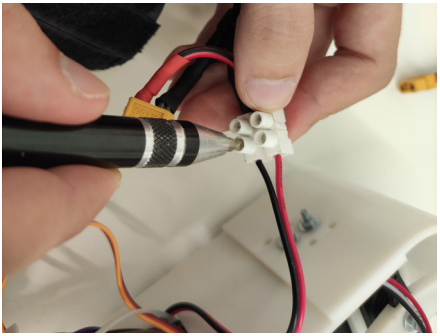

2 - Disconnect the battery and remove it from its holder.

3 - Remove the switch from the fabric and its holder. Use a lever if needed.

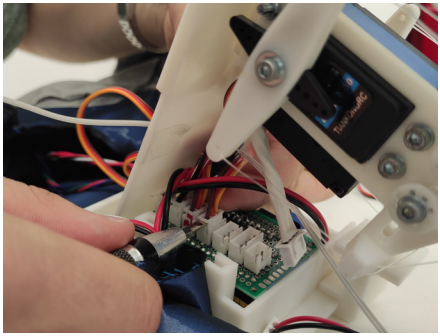


4 - Disconnect the switch from the connectors.

***ATTENTION*** *- Be careful during wire connection and disconnection, take them from the connector and not from the wire, in order to avoid to break them.*

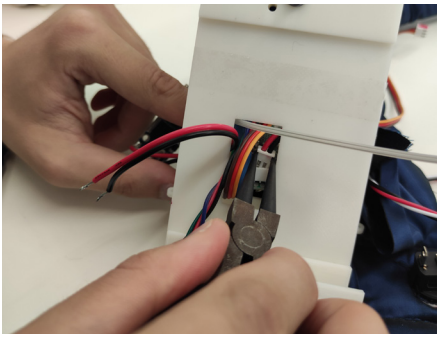


5 - Unscrew the battery and switch connectors from the step down.

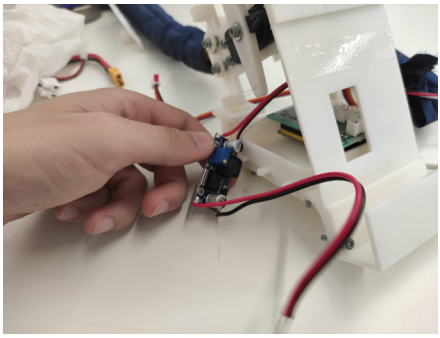


6 - Remove the pins from the JST connectors in order (from 8 to 1).

*Remember the pins need to strictly follow the connection order, also made easier thanks to the color code. JST connectors and relative pins follow a symmetrical process: from 8 to 1 to remove them and from 1 to 8 to plug them back in place.*

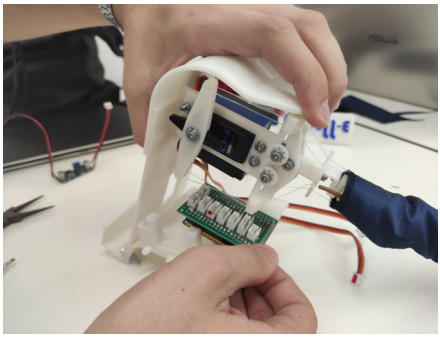


7 - Use long round nose conical pliers to remove all the pins, if needed.

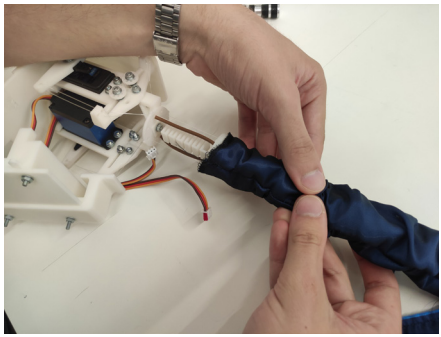


8 - Remove the step down from the internal box container.

*Bend a little bit the longer plastic plate with caution, and take out the stripboard. The microcontroller is connected above the stripboard, it is possible to remove it, be careful not to skew the pins. In case of reconnection, be careful to place with the right orientation, use as reference the red line of 5V.*

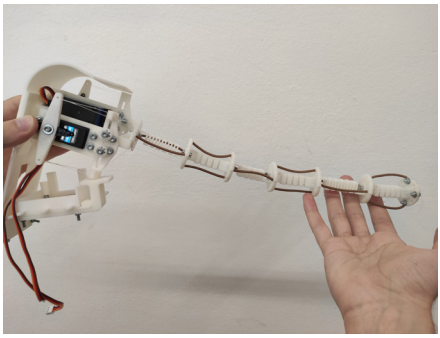


9 - Remove the ESP board from the box container, bending the upper plate if needed.

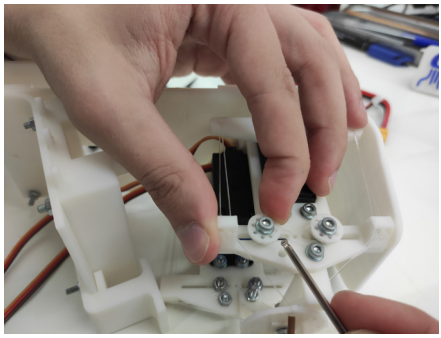


10 - Take off the covering fabric of the robotic tentacle. Pay attention to the nylon wires.

*Due to the passage of time, fish lines that are connected to servos and used to control the mechanical tentacle movements may loosen. Use a screwdriver with the screws near the servo motors to regulate wire tensions.*



11 - Once you obtain the scheleton you can use a wrench to unscrew the internal nut that guides wires.



12 - Once loosen the nut, move the circular joint and move it along the rail to calibrate the tentacle.

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